



Movement of Goods Series

Report #5: Three Bold Solutions for the Toronto- Waterloo Corridor

JUNE 2018



**TORONTO
REGION
BOARD OF TRADE**

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FOREWORD

The Toronto-Waterloo Corridor (the Corridor) is the economic zone powering this country, and the significance of its ability to fuel growth and prosperity increases daily.

Anchored by Toronto, Waterloo Region and Hamilton, the Corridor possesses the country's highest density of manufacturing and technology, largest fully-integrated cross-border supply chains and biggest passenger and cargo transportation hub—Toronto Pearson International Airport.

But, enabling infrastructure has not kept pace with the growth of this economic zone. As a result, persistent road congestion and delays limit businesses of every sector from moving goods across borders to making just-in-time deliveries.

Over the course of 2017-18, the Board, in partnership with CPCS, released the first set of reports in our Movement of Goods series. We identified the economic importance of goods movement industries in the Corridor; pinpointed our biggest bottlenecks; measured the impact of delays on consumers and businesses; and, proposed policy recommendations to improve goods movement in the Corridor.

2018-19 represents the second phase of our research efforts. In our fifth report of this series, we closely examine our policy recommendations and transition our ideas into tangible actions with three actionable ideas to address goods movement. We propose: activating off-peak deliveries to improve safety and save time and fuel; regional planning and co-ordination by a council similar to the Texas Freight Mobility Council with a mandate to address current pain points and accommodate future growth; and, build lanes above or below the existing roadways on Highway 401 near

Pearson to unblock the Corridor's biggest bottleneck.

These ideas stand to make a positive and lasting impact. For too long, governments at each level and from every party have avoided taking measures to address road congestion, which costs each household in the Corridor an additional \$125 annually in higher prices for every-day goods. This congestion is physically holding back the region's businesses from being globally competitive.

For our economy to thrive and grow in the face of increasingly competitive threats from our largest trading partner, it's critical we get our house in order and enable our businesses to be globally competitive. International companies who consider locating their manufacturing operations in the Corridor have a world of choice when deploying investment capital. People and goods congestion in the Corridor must be addressed for us to remain relevant.

The Board undertook this series to demonstrate the need for—and our commitment to—the development of a strategic, multimodal approach to build and connect the Corridor, create jobs for Canadians and enable global trade among our small and medium-sized enterprises.

We've outlined the challenges, proposed policy recommendations, and now, presented three solutions. Let's move forward through action and accelerate the power of this economic zone.



Jan De Silva
President & CEO
Toronto Region Board of Trade

INTRODUCTION

The challenge of getting around the congested transportation network of the Toronto-Waterloo Corridor (the Corridor) is well known to both residents and visitors. Less directly felt is the effect of traffic congestion on the movement of goods. Slow and unreliable transportation hurts the Corridor’s competitiveness by increasing the cost of doing business.

From manufacturers getting goods to domestic and global markets to consumers enjoying stocked grocery shelves, the movement of goods underpins the high quality of life that the Corridor’s residents enjoy. This *Movement of Goods* series

takes a multimodal perspective, describing how air, marine, pipeline, rail and trucking interact in moving goods across the Corridor (the definition of the Corridor is shown in Figure 1).

MOVEMENT OF GOODS SERIES REPORTS & RELEASE DATES

- **Report #1 released August 2017:**
Economic Impact of the Movement of Goods in the Toronto-Waterloo Innovation Corridor
- **Report #2 released November 2017:**
Movement of Goods Challenges in the Toronto-Waterloo Corridor
- **Report #3 released November 2017:**
Toronto-Waterloo Corridor Movement of Goods Business & Consumer Impacts
- **Report #4 released February 2018:**
Polices to Improve Goods Movement



REPORT #1



REPORT #2



REPORT #3



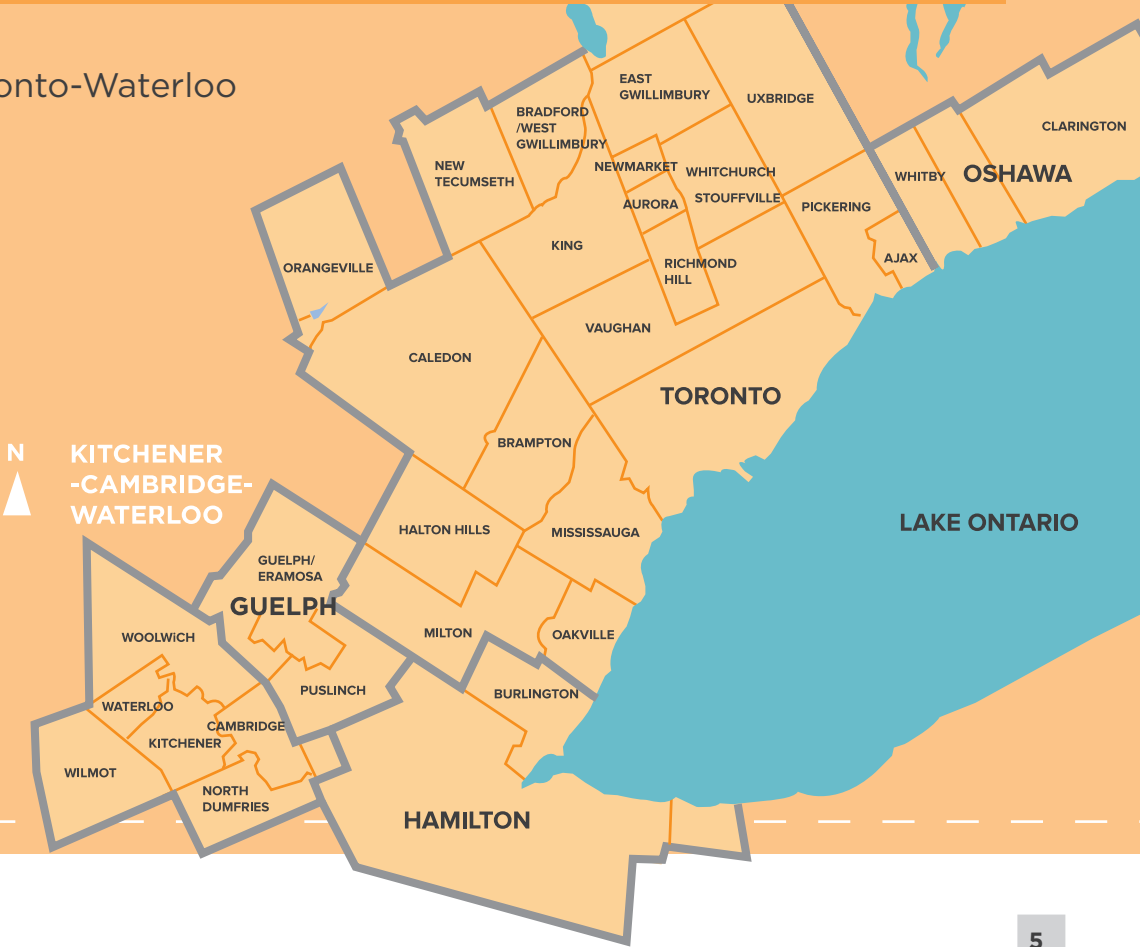
REPORT #4

FIGURE 1: The Toronto-Waterloo Corridor

LEGEND

CENSUS METROPOLITAN AREA

MUNICIPALITY



THIS REPORT BUILDS ON THE POLICY RECOMMENDATIONS FROM THE FOURTH REPORT. IT IS A DEEP DIVE INTO THREE BOLD SOLUTIONS THAT CAN GREATLY IMPACT MOVEMENT OF GOODS IN THE CORRIDOR.

SOLUTION #1
EXPANDING OFF-PEAK DELIVERIES

Shifting more deliveries to times of day when roads and highways are less congested, saving time and fuel and improving safety. The main region-wide benefit to the public is congestion reduction.

SOLUTION #2
PROMOTING THE GROWTH OF CANADA'S TRANSPORTATION MEGA HUB

Creating an action-oriented private sector led *Transportation Mega Hub* Council to unlock the full potential of the Corridor's most important movement of goods cluster; centred on the Toronto Pearson International Airport and the CN Brampton and CP Vaughan intermodal terminals.




SOLUTION #3
UNBLOCKING THE CORRIDOR'S BIGGEST BOTTLENECK

Addressing bottlenecks with an extensive expansion of Highway 401, specifically the chokepoint near the airport; a *Super Express* system with newly-built lanes (and the potential for self-funding through tolls).


These ideas are more than tweaks. They get to the heart of the most pressing movement of goods challenges in the Corridor—congestion, land use, last-mile connectivity, and strategic vision.

CHALLENGES RECAP

The second Movement of Goods report identified the challenges preventing the Corridor's efficient movement of goods:

-  **Road Congestion:** Pervasive congestion on the highway network hurts reliability and is the most serious challenge highlighted by industry leaders.
-  **Land Use Conflicts:** Rapid residential growth is putting pressure on traditional industrial lands, in particular near ports and along rail lines.
-  **Last-Mile Connectivity:** Most deliveries to their final destination (or from pick-up points) are made by

trucks, which must share road space and sometimes loading space with other road users.

 **Need for Strategic Vision:** Goods movement needs and issues have traditionally not been afforded the same level of attention as passenger needs.

These challenges matter because Movement of Goods industries are responsible for \$171 billion in gross domestic product (GDP) and 1.4 million direct jobs—more than one-third of all GDP and jobs in the Corridor. Yet traffic congestion alone costs households in the Corridor an extra \$125 per year in higher prices for everyday goods and hurts the Corridor's economic competitiveness for businesses.



EXPANDING OFF-PEAK DELIVERIES

THE CHALLENGE

Manufacturers, stores, restaurants and other businesses depend on the timely delivery of goods. Currently delivery trucks are transporting goods from distribution centres (DCs) in Mississauga, Brampton, Vaughan and Milton to various destinations across the Toronto-Waterloo Corridor, contributing to congestion on the roadways.

Traditionally, trucks start at DCs around 7AM, complete their deliveries around the Corridor, and return to the DC around 3PM. But with worsening traffic congestion, return times are being stretched to 4 or 5PM—meaning more trucks on the road during both peak commuting periods.

Trucks represent around 10% of vehicles on busy highways such as Highway 401.¹ A 125-km (round trip) truck route from a DC in Mississauga to centrally located stores takes the same road space as about 20 passenger cars, assuming an average 12.7-km trip distance for passenger vehicles and a 2.0 passenger-car equivalent (reflecting the larger footprint and slower acceleration of trucks).² That means shifting just one truck trip out of peak daytime hours would free up scarce road space for about 20 passenger vehicles. The true number is likely even higher, taking into account road blockages from curbside deliveries.

OFF-PEAK DELIVERIES (OPD) are already used by many shippers in the Corridor, though not as frequently

as many of them would like. Shippers in the Corridor note that where it is successfully in place, OPD is associated with cost savings of 10-20%. Many shippers that already utilize OPD use it for 20-30% of their routes, however would like to reach 50-80% for dense urban areas.³ OPD is most effective in dense urban areas where a single office complex might have several hundred trucks per day, and where removing trucks from daytime hours would significantly reduce conflicts with pedestrians and cyclists and improve the efficiency of deliveries.

WHAT IS OPD?

Off-Peak Deliveries (OPD) refer to deliveries outside of the traditional daytime period, either in the evening (6-11 p.m.) or overnight (11 p.m. – 6 a.m.). Manufacturing and logistics facilities often already ship and receive at all hours, but increasingly stores and restaurants are being targeted to utilize OPD as well.



EXPANDING OFF-PEAK DELIVERIES

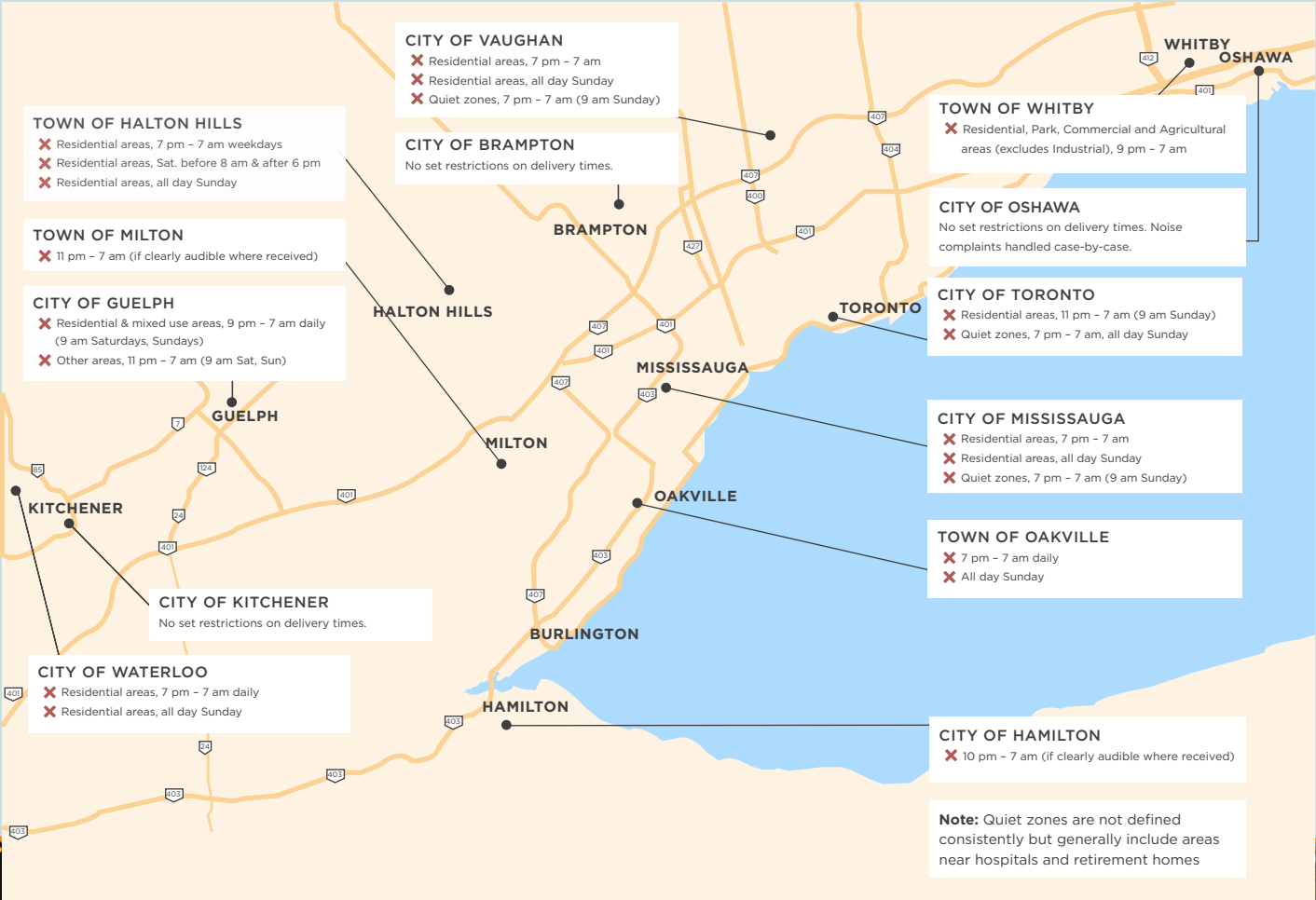
Who are the Key Players?



Source: CPCS analysis

*Some companies are responsible for two or even all three of these roles.

Figure 2: Delivery restrictions are inconsistent across municipalities



Source: CPCS analysis

There are two major impediments to increasing OPD:

- 1 Noise and municipal noise bylaws
- 2 Industry coordination

1. NOISE & MUNICIPAL BYLAWS

Municipal bylaws are a particular challenge. Leaving aside overnight deliveries, many municipalities do not permit evening or Sunday deliveries, as shown in Figure 2 (Note: only selected municipalities are shown). These restrictions pose challenges for companies that would like to do more OPD in the Corridor.

2. INDUSTRY COORDINATION

As an overarching theme, the greater the level of coordination between shippers, carriers, and receivers, the more likely OPD will be successful. For example, one international restaurant chain mandated all its stores in the Corridor to shift to receiving in off-peak hours in response to a proposal from its distributor offering a rate discount.⁴ More often, shifting to OPD is a process of negotiation that takes into account variable delivery windows and the needs of receivers.

Carriers generally need a critical mass of receivers to shift off-peak, so that the benefits of faster travel are not offset by having to follow more circuitous routes. A single route can have anywhere from three to several dozen stops, depending on the shipment sizes—causing challenges even for the bigger players. For example, one national grocery retailer that currently completes 35% of its deliveries off-peak noted that it needs alignment from all stores on a route in order to maximize the efficiency of delivery runs. For this reason,

a store may not be able to shift to OPD even if the shipper, carrier and receiver are all interested.

Leadership in resolving these coordination challenges must come from the private sector, but there are ways governments can help—starting with making it easier for companies already using OPD to do more, and as a next step promoting and possibly incentivizing OPD.

Figure 3: Practical success factors for OPD

	MORE FAVOURABLE FOR OPD	← →	MORE CHALLENGING FOR OPD
Type of Store	Corporate stores	Franchises	Independents
Staffing	Staffed 24 h	Store busiest in daytime	Small staff, limited hours
Products	Low-value, high-velocity products		High-value, low-velocity products
Carriers	Vertically integrated (in-house carrier)	Dedicated carriers	For-hire carriers
Labour	Market conditions		Collectively-bargained conditions
Loading Zone	Far or well shielded from residences	Near residences but high ambient noise	Adjacent to quiet neighbourhoods
Public Response	Supportive public-sector agencies		Restrictive public-sector policies

Source: CPCS based on consultations and literature review



OUR SOLUTION

Industry and the general public both stand to benefit from OPD. The benefits for carriers are increased asset utilization, faster and more reliable routes, and cost savings. The main region-wide benefit to the public is congestion reduction.

Comprehensive data on urban delivery volumes in the Corridor is not readily available, but in a more general sense, daytime (7AM - 7PM) truck volumes on Highway 401 are approximately twice as high as in the evening and overnight (7PM - 7AM), according to data from the Ontario Ministry of Transportation. Attaining a more even balance in truck volumes would mean shifting around 500 - 1,000 trucks out of the busiest hours from the busiest parts of Highway 401 (corresponding to a 30-40% reduction of truck volumes).⁵

Aside from these general Corridor-wide benefits, there are benefits specific to urban areas such as Downtown Toronto and other metros such as Kitchener-Waterloo:

- **Curbside Deliveries:** Trucks delivering at the curb block road lanes. Shifting some of these to OPD can lead to fewer bottlenecks on congested streets.
- **Safety:** In urban settings with many pedestrians and cyclists, shifting trucks from daytime hours can improve safety and cyclist comfort.
- **Local Emissions:** Trucks create air pollution, but the impacts on pedestrians and cyclists can be reduced by shifting deliveries off-peak when fewer people are outside
- **Access:** Less time spent looking for curbside space—or queuing to enter loading docks and underground facilities—cuts down on delivery times and leads to reduced instances of trucks “circling the block”.
- **Parking Tickets:** Carriers have observed an increase in parking tickets accompanying the recent towing/ticketing

blitz in the City of Toronto. One carrier noted the example of a single parking enforcement officer that trailed a truck up Yonge Street, handing out five tickets consecutively at successive delivery points. While carriers make efforts to avoid parking illegally, limited availability of loading space can make this challenging. If municipalities are willing to accept reduced parking ticket revenues, promoting OPD can be an effective way to make greater use of scarce curbside space.

OPD PILOTS IN THE CORRIDOR

The Ontario Ministry of Transportation's (MTO) 2015 **Pan-Am Games pilot project** was a voluntary temporary initiative to shift hundreds of stores and restaurants to off-peak hours to offset the effects of road restrictions on provincial highways during the Games. The pilot involved over 500 receiver locations and 18,400 deliveries were diverted.

Building on the MTO's pilot, the **Region of Peel** is currently undertaking its own pilot, which is smaller and more targeted with six major companies serving as participants. The five metrics that will be assessed are travel time, delivery (unloading) time, emissions reductions, noise levels, and cost savings. Peel is also working closely with its municipalities to review noise bylaws. In the long run, Peel's experience will be valuable for decision makers interested in expanding OPD across the Toronto-Waterloo corridor.

Sources: MTO (2016), “Off-Peak Delivery” (CSCE Conference); discussions with Region of Peel



OPD IN OTHER BIG CITIES

London, UK has been a leader in OPD, with Transport for London (TfL) taking a central coordinating role. TfL oversees the Re-timing Deliveries Consortium, which consists of freight industry representatives, retailers and London boroughs and works to embed OPD into business-as-usual practices. The guidance documents available on TfL's website provide extensive best-practice guidelines on topics like public-private collaboration, noise reduction, and engaging residents—that could be valuable for promoting OPD

more systematically in the Corridor.

New York City undertook a two-stage pilot program (initial pilot and implementation) for “off-hour deliveries” between 2010 and 2013. Median point-to-point travel speeds for deliveries in Manhattan were 50% higher off-peak versus the a.m. peak, and 130% higher than the midday and PM peak periods. One of the most notable parts of the pilot was the use of monetary incentives for participating companies—\$2,000 (USD) per receiver for successful participation

in the pilot, helping cover added costs such as installing systems for unassisted deliveries. Researchers found that 90% of the receivers that tried unassisted OPD have continued this practice even after incentives were ended.

Sources: Transport for London website -“Retiming Deliveries”; Sustainable Streets Index 2010, “Off-Hour Deliveries”; Holguin-Veras (2013), “Overall Impacts of Off-Hour Delivery Programs in the New York City Metropolitan Area.”

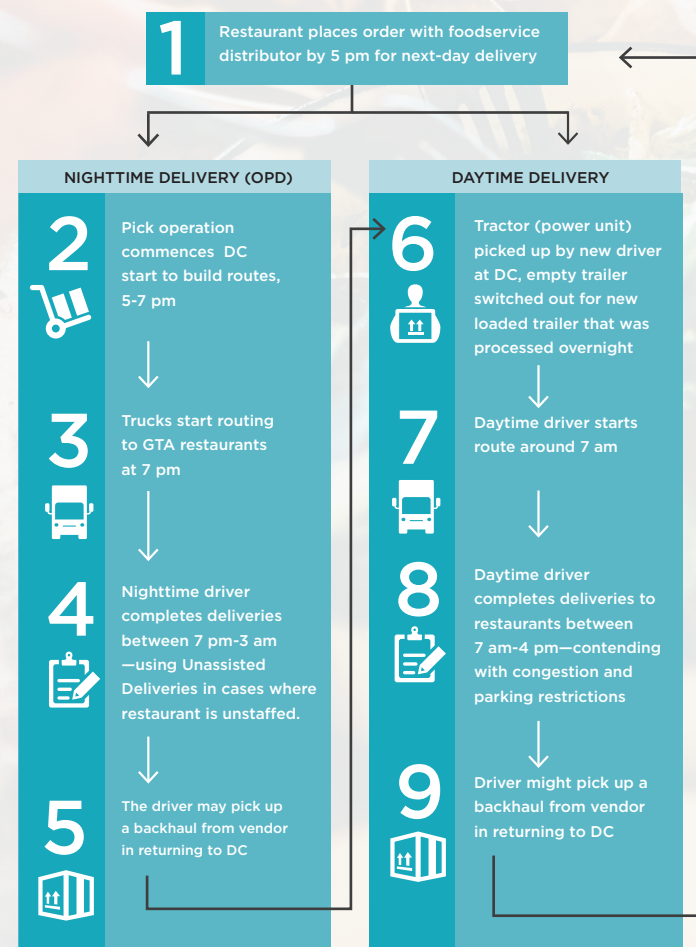
FIGURE 4: Example of How OPD Works: Foodservice Distributor

BENEFITS: Using OPD means an order made at 5 pm is in hand faster—by the start of business next morning. Routes that are shifted to OPD also have typical cost savings of around 10-20% due to reduced congestion and reduced usage of toll roads.

TYPICAL DELIVERY: A foodservice distributor will ship anywhere from 1-7 times a week to a restaurant, depending on needs and storage capacity. Each delivery is about 40-90 cases (imagine each case as about the size of a case of pop, or a bit taller).

WHAT IS IN A DELIVERY: Most restaurants do not have dock facilities, so the distributor uses a ramp and hand cart to deliver from truck to restaurant. Each cart holds 7-8 cases, meaning this process is repeated 4-10 times depending on the size of shipment.

UNASSISTED DELIVERY: For restaurants that are unstaffed, the driver has access to the alarm code and is given specific instructions on where the product goes. The driver scans each case, creating an invoice. The restaurant verifies shipment in the morning on arrival.



CUSTOMER PREFERENCES: Restaurants vary in preferring peak vs. off-peak deliveries. For some restaurants, deliveries during the busy daytime period are disruptive—staff are fully utilized and delivery trucks get in the way of customers in the parking lot. These restaurants prefer to have inventory on hand at the start of the day.

CHALLENGES: Food delivery trucks need to run their refrigerated unit (reefer) for the duration of the delivery depending on outdoor conditions. The noise from these units, as well as other regular activities (e.g. back-up beeper) can lead to noise complaints from nearby residents. Each municipality has its own regulations governing noise and delivery hours restrictions. Some restaurants are also sensitive to the perception of noise problems, whether or not any complaints have been made.

BACKHAULS: After completing a delivery route, the empty trailer is used to deliver products from food manufacturers and other suppliers to the DC, where they can be sorted and picked.

Source: Compiled by CPCS in consultation with a large foodservice distributor serving the Toronto-Waterloo corridor

HOW TO MOVE FROM IDEAS TO ACTION

In order to reduce peak congestion and decrease urban conflicts between trucks and other transport modes, the Corridor should expand the use of OPD.

The first step is for municipalities to reduce bylaw restrictions to provide more options to those companies that are willing to utilize OPD. The second step is for public agencies to promote, encourage, and possibly incentivize OPD through pilot projects and ongoing policy directions.

LIVING WITH NOISE

For the most part, restaurants and stores cannot receive the products they need, in the quantities needed, by any mode other than truck. Noise and noise bylaws are the number one OPD challenge recognized by industry executives. On the one hand, there is general recognition that deliveries are going to cause some noise, despite best efforts to reduce it. On the other hand, acceptance of some noise in a growing megaregion may be a worthwhile tradeoff when compared to the alternative of further worsening traffic congestion, the competition for curbside space, and daytime safety and local emissions impacts on pedestrians and cyclists.

NOT ONE-SIZE-FITS-ALL

It is important to recognize that OPD is not a one-size-fits-all solution. Courier deliveries, for example, are harder to shift off-peak since most businesses and residents are not amenable to pickups and deliveries at all hours. These situations may call for other creative solutions, such as bike deliveries or consolidating deliveries into access/pick-up points. In other cases, receiver and carrier labour availability, labour issues, and other factors may complicate OPD and make it difficult to achieve. Private businesses are often willing to trial new and creative solutions, and cities and the Province should do everything they can to welcome partnerships and to encourage private-sector innovation—accepting that not every new idea or trial will work out.

Figure 5: How different agencies can support OPD

WHO	ROLES
Ontario Ministry of Transportation (MTO)	MTO should continue to promote and encourage OPD at a provincial level, building on its 2015 Pan Am pilot. MTO should play a role similar to TfL in London, convening public and private industry stakeholders to develop practical guidelines for municipalities, carriers, and receivers. The aim of these efforts should be to instill OPD as a business-as-usual practice , and to educate policymakers and members of the public on the benefits.
Board of Trade and Partners	Downtown Toronto office complexes each receive as many as two hundred trucks daily delivering to offices, retailers and restaurants. Shifting just one large complex off-peak could have the same impact as shifting a small neighbourhood. The Board of Trade can play a leading role, together with property managers, the City of Toronto, the Ontario Trucking Association, and receivers in making this happen. A pilot project involving one or two major office complexes in downtown Toronto would be an excellent starting point.
Upper-Tier Municipalities	Upper-tier municipalities across the Corridor should follow the Peel pilot project closely for tips on how they can encourage OPD in their jurisdictions. For example, the City of Toronto should undertake a Downtown OPD pilot project and make OPD a significant focus of its forthcoming Freight Strategy, since Toronto in particular stands to have an outsized benefit. Other municipalities should also consider pilot projects.
Lower-Tier Municipalities across the Corridor	Truck delivery routes do not follow jurisdictional boundaries. Municipalities across the Corridor that restrict truck deliveries on evenings and weekends should consider revising their noise bylaws to strike a balance between supporting OPD and addressing the legitimate noise concerns of residents. Municipalities should also play a leading role in educating councillors and members of the public on the benefits of OPD.

Source: CPCS



PROMOTING THE GROWTH OF CANADA'S TRANSPORTATION MEGA HUB

THE CHALLENGE

The area around Toronto Pearson International Airport and the CN Brampton and CP Vaughan intermodal terminals is very much the Corridor's direct connection to the world. The area is being held back by inadequate transportation infrastructure for people and goods, disjointed governance and difficulty of planning across municipal boundaries.

This *Transportation Mega Hub* (Figure 6) is the leading goods movement cluster in the Corridor and likely Canada.⁶ It includes:

- Canada's most important cargo and passenger airport, Toronto Pearson International.
- Two of Canada's most important rail intermodal (container)

terminals, which connect the Corridor's businesses with the North American continent and seaports throughout the world.

- The intersection of some of Canada's most important highways (Highways 401, 409, 427, 410 and 407), and
- Numerous distribution centres and services ancillary to the movement of goods.



PROMOTING THE GROWTH OF CANADA'S TRANSPORTATION MEGA HUB

Figure 6: A Goods Movement Lens on the Transportation Mega Hub

PEARSON AIRPORT

Airports are critical for shipping high-value and time-sensitive commodities, such as pharmaceuticals, fresh food products and specialized machinery.

Toronto Pearson International Airport contains over 1.2 million square feet of warehouse space, with room for expansion, and is capable of processing 1 million tonnes of cargo annually.

Pearson is the busiest cargo airport in Canada—especially for international cargo. It handles 43% of all international cargo moved through Canadian airports—nearly twice as much as second-place Vancouver.

FREIGHT FORWARDERS

Freight forwarders support exporters, manufacturers and other businesses by organizing their shipments—simplifying the process of shipping by multiple modes and across international borders.

Of the Canadian International Freight Forwarders Association (CIIFFA)'s 250+ nationwide members, the largest concentration are in the Mega Hub cluster.

TRUCKING COMPANIES

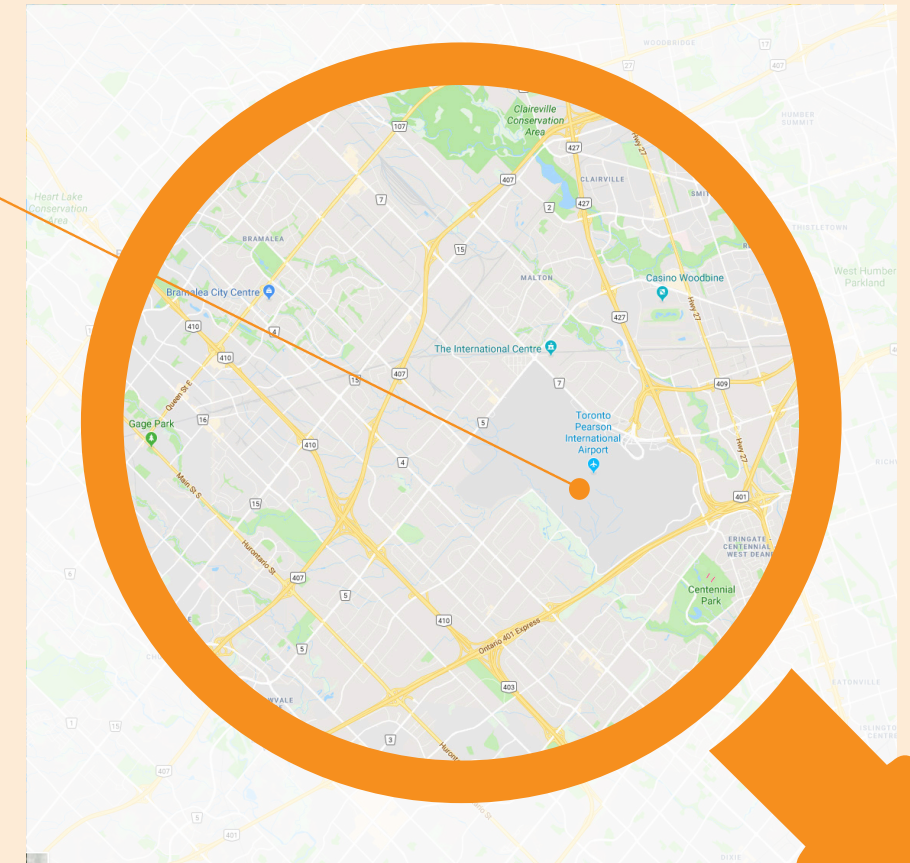
No other mode is nearly as flexible and competitive as trucking for short- and medium-haul shipments. Trucks are critical for delivering goods to stores, homes and businesses, and for providing connections to air, rail and marine facilities.

There are over 1000 trucking companies in the Mega Hub, ranging from one-man outfits to large companies with thousands of trucks.

SHIPPERS

Manufacturers and wholesalers depend on good road, rail and air connections to get goods to market—whether that means within the Corridor or beyond.

The Mega Hub is home to over 2500 manufacturers and over 2800 wholesalers, employing 100,000 people between these two sectors.



CN BRAMPTON INTERMODAL TERMINAL

At intermodal terminals shipping containers are transferred from rail cars to trucks (or vice versa). A container of consumer goods might move via a large container ship from Asia to the West Coast, then by rail to Brampton, and finally by truck to a company's distribution centre—without any need to handle the goods along the way.

The Brampton Intermodal Terminal is CN's largest in Canada, serving 949,000 container units in 2016. With volumes growing 56% annually since 2009, the terminal is close to its optimal operating capacity, necessitating plans for an additional terminal in Milton.

CP's Intermodal Terminal is located directly north of the Mega Hub in Vaughan.

DISTRIBUTION CENTRES

DCs are typically run by retailers or logistics companies. Suppliers ship truckloads of inbound goods to the DC, and the DC consolidates and sorts the goods for delivery to stores. A DC serves a network of stores within a defined geographic market, the reach depends on the product mix. Grocery retailers could have several DCs within the Corridor, whereas a home improvement retailer's DC in the Corridor might serve stores all the way from Winnipeg to St. John's.

The Mega Hub is home to over 60 DCs and warehouses of over 300,000 sqft, the largest of which are over 1 million sqft.



With daily non-stop flight connections to some 70% of global economies, Toronto Pearson supports economic growth and prosperity by enabling trade, tourism and foreign investment. This translates into 6.3% of Ontario's GDP and more than 330,000 jobs generated and facilitated by Toronto Pearson.⁷

The area around Toronto Pearson is home to the second largest employment zone in Canada, after Downtown Toronto—larger than the central business districts of Montreal, Vancouver and Calgary. By 2035, with supportive policies in place, Toronto Pearson could grow to facilitate 8.5% of Ontario's GDP and up to 700,000 jobs.⁸

Based on its geography, multimodal transportation connections and existing concentration of businesses, the Transportation Mega Hub is well positioned to be a logistics and employment hub not just of national, but of global, importance.

However the Transportation Mega Hub, and indeed the Corridor as a whole, is being held back by inadequate transportation infrastructure for people and goods. For people, the Greater Toronto Airports Authority (GTAA) has proposed a bold plan for a Toronto Pearson Regional Transit Centre that would connect with a network of transit lines and highways and help provide access to the airport and surrounding areas. This initiative would free up road capacity by shifting passengers, airport employees and regional commuters on to transit.

At the same time, the Transportation Mega Hub faces the challenges of disjointed governance, split between no fewer than six municipalities: the Cities of Brampton, Mississauga, Toronto and Vaughan; and Peel and York Regions. Peel Region, in particular, has been a leader when it comes to the movement of goods, through its Goods Movement Strategic Plan and Goods Movement Task Force, as well as by launching the forthcoming Smart Freight Centre in collaboration with three local universities (McMaster, U of T and York). However having to coordinate across multiple municipalities hinders planning.

Recognizing the difficulty of planning across municipal boundaries, the Growth Plan for the Greater Golden Horseshoe specifically identifies a need for a "coordinated approach to planning for large areas with high concentrations of employment that cross municipal boundaries and are major trip generators, on matters such as transportation demand management and economic development."⁹ Fragmented authority in this area creates significant complications in the coordination of land use and transportation, as Neptis research has noted.¹⁰

At present there is no organization with the mandate or powers to drive coordination, stakeholder alignment or investment in the entirety of the Transportation Mega Hub.

**SOUTHERN ONTARIO AIRPORT
NETWORK (SOAN)**

SOAN is a network of 11 commercial airports in the Kingston-Windsor corridor, which vary in scale and services offered, recognizing that no airport individually can meet the region's diverse and growing demands for passenger and cargo service. The network includes five airports in the Toronto-Waterloo Corridor: Toronto Pearson, Hamilton, Toronto Billy Bishop, Oshawa, and Waterloo. While each of the SOAN airports develops its own business and makes independent decisions based on local business drivers and community needs, SOAN provides a forum to understand and discuss regional economic opportunities and constraints, such as congestion, in a comprehensive way. One of the important long-term issues is improving ground transportation connectivity to and between network airports.

The five airports work together by fulfilling different and complementary roles. As one example, Toronto Pearson is developing into a global mega hub airport. On the cargo side this means providing fast, reliable service to markets around the globe, primarily in the cargo holds of passenger aircraft. On the other hand, Hamilton International Airport is one of the leading airports in Canada for domestic cargo and express overnight service, serving companies such as Purolator, Canada Post, UPS and DHL.

Sources: SOAN (2017), "Flying Together: The Southern Ontario Airport Network"; Hamilton Airport website

OUR PROPOSED SOLUTION

We propose the creation of a new coordinating arrangement for the Transportation Mega Hub: the Transportation Mega Hub Council.

The Council's mandate would be to promote the Mega Hub, along the lines of the successful CargoM initiative in Montreal (see sidebar for more information).

The Transportation Mega Hub Council would:

- Align stakeholder interests in the Mega Hub
- Secure and coordinate investment by all levels of government and the private sector in projects benefiting the movement of goods in the Hub
- Generate practical recommendations to improve coordination between municipalities (e.g. on strategic goods movement networks)
- Provide regulatory alignment between municipalities and practical strategies to improve the movement of goods
- Carry out research projects to support the Council's activities

The Council would directly complement and build on existing successful goods movement initiatives within the cluster. For example, the Council would build on the work done by GTAA through its Airport Master Plan and efforts to develop the Airport into a global hub, including through the Toronto Pearson Regional Transit Centre.

Likewise, the Council would support and build on the work of Peel Region on movement of goods issues, including its Goods Movement Task Force, by ensuring these kinds of initiatives are expanded and coordinated across jurisdictional boundaries.

Ultimately, the Council can help drive investment in the Mega Hub, and generate funding for projects with a particular benefit to the Mega Hub (such as *Super Express*—see third section of this report).

CARGOM

Since being established in 2012, **CargoM** has pursued a mandate of promoting Greater Montreal as an intermodal hub that contributes to the economic development of Greater Montreal and Quebec. Specifically, CargoM initiates developmental projects, advocates for and promotes the cluster, facilitates sharing best practices, influences regulations, and promotes industry labour attraction and retention.

CargoM has a five-person executive committee and 16-person board of directors, both comprised of leading private-sector stakeholders such as industry associations, transportation and logistics companies, and shippers. The board is supported by five observers representing public agencies. CargoM is funded by various levels of government and by its member companies and organizations.

Some examples of CargoM's recent activities include:

- Conducting research measuring freight fluidity in Montreal's East End, and working with the public sector in implementing projects to improve traffic fluidity
- Developing a data-sharing platform to better coordinate container movements around the Port of Montreal
- Collaboration with the City of Montreal on intelligent transportation and integrated traffic corridor projects
- Ensuring the coordinated interests of the cluster are represented in local and regional plans and programs (e.g. public-sector policies, projects and strategies)
- Production of promotional materials, organization of trade missions

Source: CargoM website

HOW TO MOVE FROM IDEAS TO ACTION

With any new structure, there is a risk of simply adding a layer of bureaucracy without achieving tangible results.

For this reason, it is critical that private-sector stakeholders whose businesses rely on the Mega Hub's transportation system take a leading role in constituting and leading the Council. The Province should also play an important role in coordinating municipalities: so that the Province's role is not divided among multiple ministries, the Premier's Office should lead provincial involvement.

Similar to CargoM in Montreal, the Council should consist of major manufacturers and distributors with key facilities in the Hub, transportation providers in the Hub (railways, GTAA, trucking/logistics operators), and industry associations (e.g. Ontario Trucking Association), as well as representatives of agencies from all three levels of government (with at least observer status).

In contrast to CargoM, the Transportation Mega Hub Council would focus specifically on the Mega Hub rather than the entire Corridor, and would play a particular role in ensuring coordination on freight-related issues across municipal boundaries. Future reports will explore opportunities to set up an organization similar to CargoM for the Corridor as a whole.





UNBLOCKING HIGHWAY 401—THE CORRIDOR'S BIGGEST BOTTLENECK

THE CHALLENGE

Highway 401 is the most heavily used truck corridor in the region, an important international trade corridor, and a critical highway for goods and people movement. Yet Highway 401 is chronically congested.

The most severe bottleneck is directly adjacent to the Transportation Mega Hub (see preceding section), near the airport. Slow speeds are not only a peak issue: within this bottleneck, average weekday truck speeds increase from under 30 km/h in the AM peak to 60 km/h midday, before dropping back to 30 km/h in the PM peak—all well below the 100-km/hr speed limit.

A recent study found that the Toronto area has 10 of the top 20 highway bottlenecks in Canada.¹¹ Highway 401 near the airport is ranked the top highway bottleneck in Canada, with 3.2 million hours of delay per year for trucks and cars.¹² This same bottleneck make the top 10 list in North America, along with bottlenecks in the Chicago, Los Angeles and New York areas.¹³

A LACK OF OPTIONS

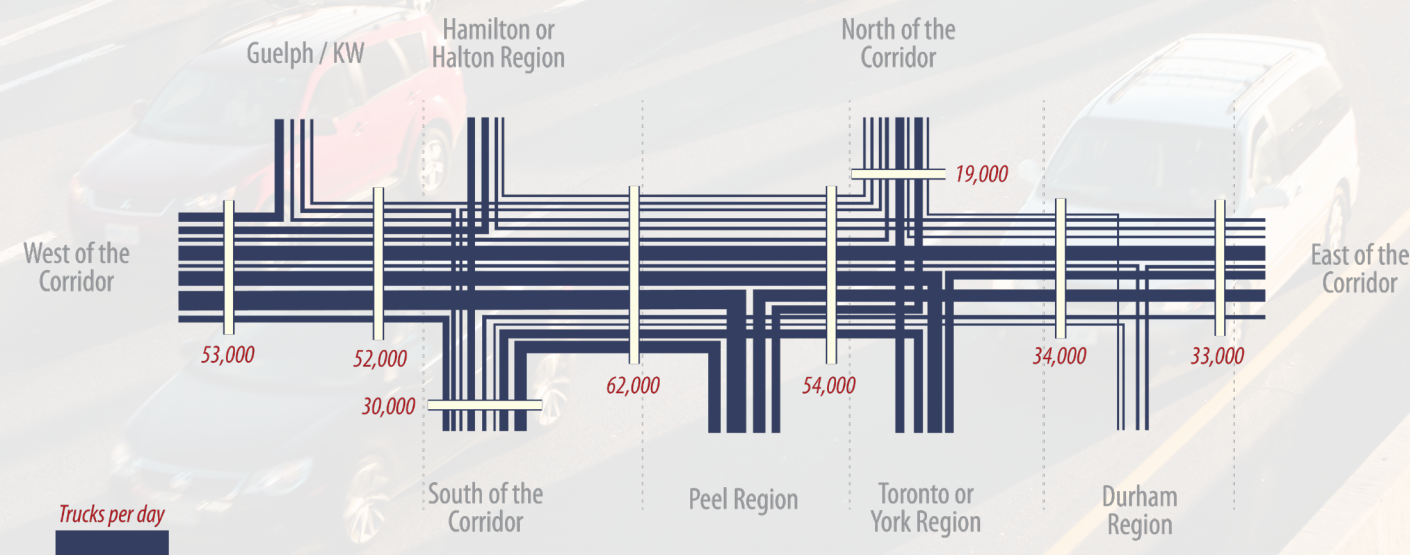
While these congested megaregions are among the largest economies in North America, familiarity with congestion does not make its cost any less real. Furthermore, while other

major North American metropolitan areas have similar levels of congestion, they also have a dense network of parallel highways providing alternative travel options. Having options is of value for goods movement—allowing vehicles to re-route to avoid incidents and to bypass heavy commuter routes to travel to and from the commercial and industrial suburbs where (urban deliveries aside) most trucking activity takes place.

The Toronto-Waterloo Corridor is particularly constrained in the east-west direction—which is also the direction of most truck demand (as illustrated in Figure 7). To a great extent, trucks have only two options—Highway 401, one of the most congested in North America; and the tolled Highway 407, one of the most costly for users. Highway 407 provides fast, reliable service for businesses requiring highly time-sensitive delivery, although many businesses consulted for this study indicated they prefer to use Highway 407 infrequently and only in critical situations, if at all.



Figure 7: Truck Travel Patterns in the Corridor (To, From, and Through)—Trucks per Day



Source: MTO Commercial Vehicle Survey (2012), scaled to 2016 truck volumes. Note: Not specific to any single route/highway. Graphic excludes internal trips (start and end within the Corridor)—these trips are underrepresented in the sample due to cordon locations.



A BROKEN EXPRESS SYSTEM

Between Mississauga and Pickering, Highway 401 consists of parallel, physically separated collector and express lanes. The purpose of express lanes is to provide cars and trucks a speedy alternative to the collector lanes. But they are not fulfilling this function: the express lanes have become so congested, they do not provide a meaningful speed advantage.

Furthermore, there is an eight-km gap in the express lanes near the airport, where the highway narrows from 16 lanes to 10—the very definition of a bottleneck. This chokepoint (Figure 9) is the most congested part of Highway 401—and is located right alongside the Mega Hub, the Corridor's most important freight cluster (see preceding section).

Figure 8: Near the airport Highway 401 narrows from 16 to 10 lanes



Photo credit: Veiko Parming, CPCS

Figure 9: Highway 401 chokepoint near the airport



Source: CPCS analysis of MTO iCorridor data (2016)

OUR SOLUTION

As described in the fourth report presenting policy recommendations, improvements like ramp metering and variable speed limits can help smooth traffic flow—but those solutions are likely to provide a comparatively small amount of congestion relief. If congestion is going to be addressed in a meaningful, large-scale way, there are essentially three options (See Figure 10)—each with benefits and drawbacks.

NO PERFECT OPTIONS

New highways such as the GTA West Corridor and Niagara-GTA Corridor would benefit the movement of goods by adding capacity and serving as alternatives to the highly congested Highway 401 and QEW. However, the Province recently elected not to proceed with an environmental assessment for the GTA West Corridor, which would have linked Highway 401 in Milton with Highway 400 in Vaughan.¹⁴ The Province has also indicated its opposition to road tolling.¹⁵ All levels of government are investing heavily in new transit infrastructure. New transit can benefit goods movement by helping to shift auto commuters from congested highways. However, transit investment on its own is not enough—these transit investments are unlikely to lead to a reduction in automobile commuting unless paired with coordinated land use policies (such as large-scale intensification around transit stations). For example, Metrolinx’s recent 2041 Regional Transportation Plan, comprising over 100 transit projects, would only increase the share of commuters using transit from 14.2% (2011 region-wide baseline) to 14.7% in 2041.¹⁶

While autonomous vehicles hold promise, a strategy of simply waiting for autonomous vehicles to solve congestion problems does not provide congestion relief today and may never.

SUPER EXPRESS

We propose *Super Express*—a concept that marries all three of the options—an expansion of capacity that could optionally be funded with toll revenues and that would be well suited to autonomous vehicles when they arrive (but not dependent on waiting for mass adoption).

Super Express involves a very significant expansion of the capacity of Highway 401 using a combination of double-decked construction, truck priority, and autonomous vehicle-readiness. The new construction would target the most congested parts of Highway 401—starting most critically with the section near the airport and eventually moving east toward the Don Valley Parkway. For reference, similar projects in Texas cost around \$4-10 billion CAD for 20-50 km of double-decked highways adding 2-3 lanes per direction (see text on next page)—a similar order of magnitude to recent and planned subway extensions in the Corridor.

Figure 10: Ultimately there are three ways to relieve congestion

OPTION	WHAT IT MEANS	BENEFITS	DRAWBACKS
1) Build New Infrastructure	Increasing capacity of roads and highways (expansion or extensions), or building high-capacity, high-speed transit to provide commuters with meaningful alternatives to driving.	New capacity in locations of high demand would be heavily used. New infrastructure does not impose direct costs on the users of existing infrastructure (unlike tolls).	Mass transit is often very expensive (subways cost around \$500 million per km—new highways around \$100 million per km). Transit investments that do not meaningfully improve travel times may not shift commuters out of cars. Risk of projects that do not live up to “build it and they will come” expectations of usage. New highways can cause sprawl. May not solve congestion as more users will be attracted to the new capacity quickly resulting in congestion once again.
2) Price Existing Infrastructure	Charging a dynamic, variable toll on the Corridor’s highway network in order to ensure smooth free-flow travel speeds and increase vehicle throughput.	Relatively low cost compared to building new capacity. Would improve travel times and reliability for cars and trucks (faster and less variable travel – similar to Highway 407). Prices that vary by time of day would encourage changes in work hours, telecommuting, carpooling, off-peak delivery etc.) and lead to more efficient use of the highway network.	Tolls are generally not politically palatable and can create winners and losers (e.g. residents of certain jurisdictions, commuters of various modes, etc.) If not offset by other measures, tolls can be a cash grab at the expense of the existing users of a highway (including trucks and cars that do not have other viable travel options)—making them worse off. Even modest tolls may be too expensive for some cars and trucks, diverting these vehicles to congested arterial roads. Sometimes a toll that is high enough to reduce congestion can be high enough to unduly discourage economic activity.
3) Wait for Autonomous Vehicles or other technological solutions	Using road space more efficiently by eliminating the inefficient and unsafe human element in driving.	Likely low cost relative to building new capacity. Connected and autonomous vehicles could travel closer together and cause fewer slowdowns and accidents. Could significantly change the nature of mobility (more on-demand services, reduced car ownership)	Not presently available—uncertain timelines for implementation. Not clear how much connected/autonomous vehicles actually increase capacity in real-life conditions (especially if only a portion of vehicles on the road are autonomous). Autonomous vehicles may well lead to more travel, not less, worsening congestion.

HOW TO MOVE FROM IDEAS TO ACTION

As Highway 401 is under the jurisdiction of the Province, the provincial government should undertake a business case feasibility analysis of *Super Express* to to determine the most appropriate financial and engineering configurations.

Some key elements that would support a business case include:

- **The demand is already there.** This is not a “build it and they will come” project—it addresses a specific and severe bottleneck with high existing usage and most likely significant latent demand.
- Highway 401 is a critical corridor for goods and people movement and an important **international trade corridor**. There are not many east-west alternatives, further increasing the importance of Highway 401.
- This project would **significantly improve access** to the Transportation Mega Hub (see preceding section) and complements transit investments in the Hub.
- **Improved redundancy.** Providing an additional set of lanes would improve the redundancy of Highway 401 in the event of incidents; moreover having lanes above or below the existing road would reduce rubbernecking when incidents do occur, a significant cause of congestion in and of itself.
- **A revenue stream could be created.** Since this is new infrastructure, charging tolls would be less controversial. Depending on the tolling approach, the resulting revenues could fund some or all of the construction and operations of *Super Express*. A stable revenue stream could also make the

project attractive to the new Canada Infrastructure Bank, potentially providing another source of funding.

SUPER EXPRESS VS. TRUCK-ONLY LANES

Truck-only lanes restrict access solely to trucks in order to improve freight mobility. The Region of Peel studied a two-year truck-only lane pilot project on Derry Road and Highway 50, but decided recently not to go forward with the pilot, based on modelling that showed the truck lanes would not decrease travel times for cars or trucks and would have a negligible impact on safety. *Super Express* goes beyond truck-only lanes—it involves use of the entire express system rather than just one lane, and it gives priority but is not restricted only to trucks.

ASIAN MEGACITIES

Large Asian cities are typically very space-efficient when it comes to both highway and transit infrastructure. The Hanshin Expressway system in Osaka includes 259 km of elevated structures and 29 km underground. A similar Shuto Expressway network of elevated routes and tunnels is in place in Tokyo. Although these cities rely heavily on mass transit for commuter transportation, they have not neglected strategic investments in urban expressway networks to provide mobility for time-sensitive cars and trucks.

Figure 11: What is *Super Express*?

FEATURE	DESCRIPTION
Double-decked construction	Double decking involves building a second level of highway either over top of, or below, the existing highway. This would help relieve the most significant chokepoint near the airport between Highways 409 and 427. While construction may present challenges given the presence of complex highway interchanges, double decking this 8km stretch is an option that needs to be seriously considered given the severity of the bottleneck. The low-rise nature of adjacent lands may also make some expropriation economically feasible. Fixing this gap between Highways 409 and 427 should be the top priority. Double-decking may also be merited in other areas of high congestion, including from Highway 409 to 400 and from Highway 400 to the Allen Road or even east past the Don Valley Parkway.
Existing right-of-way	The key principle behind <i>Super Express</i> is making maximum use of the existing right-of-way, rather than adding new suburban highway corridors. This means alleviating gridlock without directly creating urban sprawl. There is a very high probability that the lanes will be well used right from the start. Using the existing corridor could also help to reduce negative environmental impacts.
Priority for trucks	The <i>Super Express</i> system should prioritize for goods movement vehicles—as well as buses, high occupancy vehicle/high occupancy toll (HOV/HOT) vehicles, ¹⁷ or other preferred vehicles, with the goal of maximizing passenger and cargo throughput rather than simply serving single-occupancy commuters.
Autonomous vehicle-ready	By potentially completing the express lane system from Mississauga to Pickering by resolving the gap near the airport, <i>Super Express</i> could create a fully divided, separate set of lanes on Highway 401. Once connected and autonomous vehicle technology is sufficiently advanced, the entire express system could be dedicated for autonomous trucks, buses and cars if so desired—making for even more efficient travel.
Connections	The existing express lanes do not optimally serve trucks, as there are no connections to Highway 410. Improved connections to key truck corridors such as Highway 410 or Dixie Road should be considered as part of a more detailed study of <i>Super Express</i> .

SUPER EXPRESS IS A BOLD IDEA, BUT NOT A NEW IDEA

The LBJ Express is a 13-mile (21-km) express highway system along I-635 and I-35E in the Dallas, Texas region. In 2013 this wide, suburban interstate highway was rebuilt into a double-deck structure at a cost of US\$2.7 billion. The State of Texas was able to leverage US\$2.2 billion in private investment (four-fifths of total financing) by making the express portion dynamically-priced HOV/HOT lanes. It rebuilt one of the most congested highways

in North Texas to nearly double roadway capacity.

I-10/I-35 in San Antonio, Texas is a double-deck freeway north of downtown, built in the 1980s. The highway is not tolled and consists of six elevated lanes and four lanes below. A somewhat different structure is used in St. Louis, Missouri with westbound traffic above and eastbound traffic below. A proposed 33-mile (53-km) double-deck project for I-35

near Austin, Texas would cost US\$8.1 billion. Tunneling freeways is another option used in cities like Boston (Big Dig) and Seattle (Alaskan Viaduct), although in both cases these were used near urban waterfronts and subject to large delays and cost overruns.

Source: LBJ Express website, FAQs; TxDOT Project Tracker; Austin American-Statesman (2017), “Austin vision for I-35 makeover now includes two toll lanes per side”

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END NOTES

- 1 Data from MTO (TVIS)
- 2 12.7 km is the average trip distance by automobile from the 2016 Transportation Tomorrow Survey (TTS). 2.0 PCE is used by MTO for trucks (see "Freight-Supportive Guidelines," 2016).
- 3 CPCS consultations with OPD stakeholders for this study: consultations with nine major companies that are industry leaders in the following sectors: general retail, food retail, foodservice distribution, food supplier, parcel delivery, carrier (transportation provider).
- 4 All anecdotal observations are from consultations conducted by CPCS for this study
- 5 Based on hourly MTO truck volume distributions for Highway 401 for the busiest segment—between Hwy 409 and Hwy 400.
- 6 Freight Day VI Symposium (2017), "Approach and Method for Defining a GTHA Strategic Goods Movement Network"
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- 8 Toronto Pearson International Airport, "Master Plan, 2017-2037, Summary".
- 9 Places to Grow: Growth Plan for the Greater Golden Horseshoe (2017) - see Section 2.2.5.14.
- 10 NEPTIS Foundation (2015), "Planning for Prosperity"
- 11 Canadian Automobile Association (2017), "Grinding to a Halt: Evaluating Canada's Worst Bottlenecks"
- 12 This estimate values travel time at the average hourly wage rate but does not take into account any wider economic effects from lost productivity.
- 13 If cross-referenced with a parallel US study: American Highway Users Alliance (2015), "Unclogging America's Arteries 2015: Prescriptions for Healthier Highways"
- 14 Ministry of Transportation news release (Feb 2018), "Ontario Not Moving Forward with Highway for GTA West Corridor".
- 15 Toronto Star (Jan 2017), "Wynne retreats on tolls after cabinet and caucus opposition".
- 16 Metrolinx (2018), "2041 Regional Transportation Plan for the Greater Toronto and Hamilton Area (Draft Final)." See in particular Figure 31.
- 17 High occupancy vehicle / high occupancy toll.





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